IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	**Mail Stop AF**
Robert J. Steger	Group Art Unit: 1763
Application No.: 10/608,091	Examiner: RAKESH KUMAR DHINGRA
Filed: June 30, 2003	Confirmation No.: 8130
For: SUBSTRATE SUPPORT HAVING DYNAMIC TEMPERATURE CONTROL	

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant requests review of the rejection of Claims 1-12 and 15-23 in the above-identified application. No amendments are being filed with this Request. For at least the following reasons, it is believed that the outstanding rejections are improper and without basis. This Request is being filed with a Notice of Appeal.

A. Claims 1, 2, 4, 6, 7 , and 12

Claims 1, 2, 4, 6, 7, and 12 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent No. 6,676,805 ("Tamura I"), as evidenced by U.S. Patent Appl. Pub. No. 2001/0009178 ("Tamura II"), in view of U.S. Patent No. 5,225,663 ("Matsumura").

Claim 1 recites, *inter alia*, a substrate support useful in a reaction chamber of a plasma processing apparatus, the substrate support comprising a metallic heat transfer member overlying the ceramic member, the heat transfer member having a maximum thickness of about ¼ inch, the heat transfer member including at least one flow passage through which a liquid can be circulated to heat and/or cool the heat transfer member; and an electrostatic chuck overlying the heat transfer member (emphasis added).

The Official Action acknowledges that Tamura does not disclose that the heat transfer member has a maximum thickness of about ¼ inch (Official Action at page 5, lines 7-8), but cites Matsumura to allegedly cure this deficiency (Official Action at page 5, lines 12-16). Moreover, the Official Action contends that the motivation for the combination of the applied references is to "optimize the maximum thickness of the heat transfer member . . . in the apparatus of Tamura . . . as an additional control variable for quickly raising and lowering the temperature of the heat transfer plate" (Official Action at page 5, lines 17-21). Applicant respectfully disagrees.

1. **Lack of Motivation to Combine Matsumura with Tamura**

Applicant disputes the Examiner's contention that Matsumura provides motivation to make member **2** of Tamura I smaller in thickness "as an additional control variable for quickly raising and lowering the temperature of heat transfer plate" (Official Action at page 5, lines 19-21) since the cited references seek opposite objectives, *i.e.*, Tamura I seeks to cool a substrate whereas Matsumura seeks to heat a substrate.

Matsumura discloses a heating element used for baking photoresist films on semiconductor wafers (Column 1, line 9 – column 2, line 26). The heat transfer plate of Matsumura operates by a different principle (i.e., electrode heating) than the presently claimed heat transfer member including at least one flow passage through which a liquid can be circulated to heat and/or cool the heat transfer member. Matsumura does not teach controlling the thickness of the heat transfer plate to achieve a desired heating rate and there is no suggestion in Matsumura to use a thin plate with liquid flow passages to obtain rapid heating and/or cooling as is achievable with the claimed substrate support. As such, the cited references fail to suggest the claimed substrate support.

2. **Tamura Discloses That Substrate Cooling is Primarily Achieved by Contacting the Substrate with a Cooling Gas**

Tamura discloses that the primary temperature control mechanism for the wafer is exposure to a cooling gas, rather than contacting the substrate with a holding member. Thus, a person of ordinary skill would have had no reason to modify the substrate support of Tamura I as Tamura I obtains the desired cooling via use of a cooling gas. Clearly, the cited references fail to suggest using a cooling liquid and using a thin metallic heat transfer member to provide rapid heating and/or cooling of a substrate.

3. **Tamara Provides for a Mechanism for Cooling the Holding Member**

Matsumura's heat transfer plate **1** provides no suggestion to alter the holding member **2** of Tamura I. Tamura's member **2** has "a coolant flow passage **42** for conducting a coolant to control the temperature of the substrate **1**" (column 14, lines 43-44, and Figure 9, of Tamura I) and "[t]he coolant . . . is introduced into the coolant flow passage **42** . . . to control the temperature of the holding member **2** and the dielectric material **18** at a given temperature" (column 15, lines 41-47, of Tamura I) (emphasis added). The Official Action has not provided any reasoning as to why Tamura's cooling system for holding member **2** is deficient, such that it is necessary to alter its dimensions. As such, Applicant respectfully submits that one who is skilled in the art would not have been motivated to alter the dimensions of Tamura's holding member **2**, as alleged in the Official Action.

4. Lack of Substantial Evidence for Motivation to Combine Tamura and Matsumura

The Official Action contends that the motivation for modifying Tamura with Matsumura is for "additional control variable for quickly raising and lowering the temperature of the heat transfer plate" (Official Action at page 5, lines 19-21). As the cited references fail to suggest a thin heat transfer member with liquid flow passages therein, the Official Action relies on the improper "obvious to try" rationale in modifying Tamura I.

An obviousness rejection must be based on "evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness." *In re Lee*, 277 F3d 1338, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002) (emphasis added). Furthermore, the Patent Office must "identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination." *Id.* Moreover, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected the components for combination in the manner claimed. *See In re Kotzab*, 27 F.3d 1365, 1371 (Fed. Cir. 2000). The Official Action has provided no evidence as to "a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness" in support of the alleged motivation of modify Tamura with Matsumura.

B. Claim 11

Claim 11 was rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Tamura I, as evidenced by Tamura II, in view of Matsumura, further in view of U.S. Patent Appl. Pub. No. 2002/0075624 ("Wang").

The Official Action acknowledges that Tamura I, Tamura II, and Matsumura do not disclose the features of Claim 11 and cites Wang to allegedly cure these deficiencies (Official Action at page 11, lines 1-8). Specifically, the Official Action contends that Wang's "ductile material **295**" corresponds to Applicant's "elastomeric joint " (Official Action at page 11, line 8). However, Wang discloses that "bond layer **295** is made from a metal such as aluminum, copper, iron, molybdenum, titanium, tungsten or alloys thereof" (emphasis added) (paragraph **[0066]**), rather an an "elastomeric joint," as recited in Claim 11. Thus, a *prima facie* case of obviousness has not been established.

C. Claims 15, 18, and 23

Claims 15, 18, and 23 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Tamura I, as evidenced by Tamura II, in view of Matsumura, further in view of U.S. Patent Appl. Pub. No. 2004/0163601 ("Kadotani") and U.S. Patent No. 6,184,504 ("Cardella").

Claim 15 recites, *inter alia*, a substrate support useful in a plasma processing apparatus, comprising a metallic heat transfer member overlying the ceramic member, the

heat transfer member including at least one flow passage in fluid communication with the liquid source and through which the liquid can be circulated to heat and/or cool the heat transfer member at a rate of from about 0.25-2°C/sec (emphasis added). In contrast, column 6, lines 12-27, of Matsumura, discloses an "extremely quick lowering of temperature" from 100°C to 95°C in 5 minutes, or 0.02°C/sec, which is orders of magnitude slower than the presently claimed (cooling) rate of 0.25-2°C/sec. Further, the heat transfer plate of Matsumura, which, as noted above, operates by electrode heating, as opposed to using a flow passage through which a liquid can be circulated, still only discloses a heating rate of 0.22°C/sec for a system using a heating electrode (See column 5, lines 37-42, which discloses a temperature rising time during which the heat transfer plate reached a temperature of 200°C after the start of heating of about 15 minutes). Matsumura thus discloses a system having a much faster heating rate whereas the claimed substrate support can achieve heating and cooling rates above those disclosed by Matsumura.

1. **Cardella Does Not Teach or Suggest Temperature Rate Change**

Cardella does not relate to a substrate support and provides no suggestion to modify Tamura in a manner which would achieve the claimed heating/cooling rate. While Cardella discloses that "[t]he size, number, and arrangement of channels **135** [in heat transfer member **95**] are selected to transfer heat at a rate that is greater than the highest rate at which heat will be generated by the electronic device **40** undergoing testing" (column 6, lines 1-4), Cardella is completely silent regarding the claimed heating/cooling rate from about 0.25 to 2°C/seconds.

2. **Kadotani Does Not Teach or Suggest Temperature Rate Change and Teaches Away from Liquid Coolants**

First, Kadotani discloses that flow "heat passage rate [in the electrode block **1**] can be increased [from 200 W/m^2K to 400 W/m^2K] by increasing the flow rate of the coolant, even when the heat input from the plasmas increases" (paragraph **[0077]**). Thus, while Kadotani discloses doubling the heat removal rate, Kadotani is completely silent regarding the claimed heating/cooling rate from about 0.25 to 2°C/seconds.

Second, Kadotani discloses that the cooling medium in flow channel slits **11** and **12** is heat conducting helium gas (paragraphs **[0075]**, **[0078]**), rather than a "temperature controlled liquid," as recited in Claim 15. Furthermore, Kadotani teaches away from liquid coolants, because Kadotani discloses that the use of liquid coolant require more time to adjust the temperature of the substrate, than their gas counterparts (paragraph **[0013]**). Thus, because the cited references fail to suggest all of the claimed limitations, the combined teachings fail to suggest the claimed invention.

Because a *prima facie* case of obviousness has not been established, Applicant respectfully requests the withdrawal of the rejection of Claim 15 under 35 U.S.C. §103(a). Dependent Claims 16, 18, and 23 are also patentable over the combination of applied references at least for the same reasons as those discussed above regarding Claim 15.

D. Claim 22

Claim 22 was rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Tamura I, as evidenced by Tamura II, in view of Kadotani and Cardella, further in view of Wang.

Claim 22 recites, *inter alia*, an elastomeric joint between the ceramic member and the heat transfer member, and an elastomeric joint between the heat transfer member and the electrostatic chuck (emphasis added).

The Official Action acknowledges that Tamura I, Tamura II, Kadotani and Cardella do not disclose the features of Claim 22 and cites Wang to allegedly cure these deficiencies (Official Action at page 17). However, as discussed above regarding Claim 11, Wang discloses a metal bond layer, rather an "elastomeric joint," as recited in Claim 22. Accordingly, a *prima facie* case of obviousness has not been established.

Conclusion

For at least the reasons stated above, the Examiner has not established a *prima facie* case of obviousness. Therefore, the outstanding rejections cannot be allowed to stand.

Respectfully submitted,

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